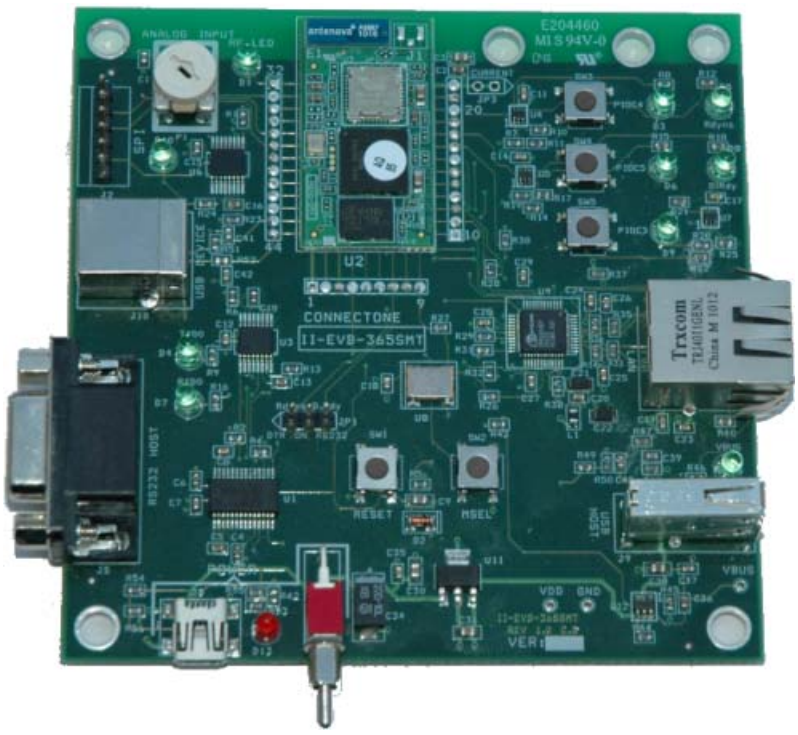
Instant Internet Evaluation Board II-EVB-365SMT

User Manual

Version 1.10



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1. Introduction

This manual is intended to familiarize customers with Connect One's Instant Internet Evaluation Board II-EVB-365SMT. The II-EVB-365SMT is an evaluation platform for the Nano WiReach™ SMT Module, which is a secure serial-to-WiFi / serial-to-LAN module that provides a wide range of commands to initiate Internet connectivity and can also act as a bridge to connect serial devices to wired Ethernet or 802.11b/g wireless LANs. Furthermore, the module can also be configured as a full-blown router between LAN and WiFi subnets. With an external USB modem communications and routing are extended to the cellular network, providing for a unique mobile router capability. The module has an economic SMT form factor and is based on Connect One's iChip CO2144 IP Communication Controller™ and the AT+i™ command set, a powerful set of Internet protocol commands developed by Connect One to manage Internet connectivity through an Ethernet, Wireless LAN or cellular connection.

The module enables sending and receiving textual and binary data, MIME-encoded email messages; downloading HTML pages or files from a Web server, or items from within a page; Web serving, as well as managing TCP or UDP socket communications (with or without SSL3) over the Internet. It also include an FTP client and a TELNET client.

Nano WiReach SMT can easily connect existing LAN based solutions to a WiFi network when used in bridging mode.

Nano WiReach SMT supports numerous WiFi security protocols such as 64/128-bit WEP encryption, AES-CCM and TKIP encryption, WPA (including AES) and WPA2 in both PSK and Enterprise modes. The module also supports the SSL3/TLS1 security protocols.

When used as a router, the Nano WiReach SMT provides IP allocation via a DHCP server and NAT translation when routing packets between a local subnet and a WAN. Three-way routing between wired-LAN, WiFi and a cellular network is fully supported. In routing mode, port-forward rules may be configured between the WAN connection and any specific local subnet node.

2. Unpacking

Take the II-EVB-365 SMT out of its box. Included in the box are:

- The II-EVB-365 SMT motherboard incorporating the iW- SM2144SMT-OB (Nano WiReach SMT module with On-board antenna).
- A serial cable with two DB-9 connectors
- A USB cable
- +9VDC Power supply adaptor (110/220 VAC)

3. Connections

1. Communications Cable:
    - **Serial RS232:** Connect one end of the RS232 cable to the D-shell, 9-pin female, Host RS232 port on the II-EVB-365 SMT (J5) and connect

the other DB-9 connector to the COM1 or COM2 serial port on your PC, or to the serial port of your embedded device.

- **USB**: Connect one the device end of the USB cable to the EVB-365 SMT USB connector (J10) and connect the other end to a Host USB port on your PC or embedded device.

2. Connect the II-EVB-365 SMT to the power supply.

4. Installing the iChipConfig Utility & Evaluation Software

II-EVB-365 SMT enables you to evaluate the Nano WiReach SMT module without changing anything in your current development environment. Using a simple terminal program on a PC, you can issue AT+i commands to the module and get responses.

AT+i commands are used to configure parameter values into iChip's flash memory and activate Internet tasks such as Email send/receive, socket manipulation, FTP sessions, Web, and more.

A full description of the AT+i protocol can be found in the *AT+i Programmer's Manual* on the Connect One website at:
http://www.connectone.com/support.asp?did=42

To assist in configuring and evaluating the iChip, Connect One supplies the iChipConfig Utility. This is a Windows-based GUI program that contains intuitive dialog boxes to fully configure iChip. It doesn't require any knowledge of AT+i commands. In addition, it contains a local firmware upgrade function.

The iChipConfig Utility also allows you to perform specific Internet communication tasks such as sending and receiving Emails, activating iChip's websites, entering SerialNET mode, and more.

For more information on the iChipConfig Utility and its usage, see the *iChip Config Utility User's Manual*.
. The latest iChipConfig Utility version and user manual can be found on the Connect One website in the *Support* section at:
http://www.connectone.com/support.asp?did=30

Most frequently iChipConfig connects to the II-EVB-365 SMT though the PC's standard RS232 Serial port. A USB Device port is also available, which allows using a USB connection as an alternative. To enable use of the PC USB port, a virtual COM USB driver needs to be loaded on the PC. The iChipConfig can then be configured to use the virtual port. Instructions for configuring the USB drivers on the PC are given below in Appendix 2.

5. Testing the WiFi module Wireless Connection

To test the wireless LAN connection, you need to configure the Nano WiReach SMT to connect to an Access Point:

1. Make sure an Access Point is connected and configured properly.
2. Start the iChipConfig Utility on your PC.

3. In the main window of the utility, click the Dumb Terminal icon.
4. In the Dumb Terminal window, enter the **AT+i** command to verify that the iChip is communicating with your PC. You should receive an **I/OK** in response. If this has failed, click the "Setup Port" button and select the correct COM port. When using a USB connection, select the USB virtual COM being used.
5. Enter the **AT+iRP11** command to obtain a report of all the Access Points available in your area.
6. Enter **AT+iWLSI**=<*ssid*>. *ssid* is the ID of the Access Point you connect to. Note that *ssid* is a case-sensitive string.
7. If you want to enable WEP encryption, configure the following parameters:
   - **AT+iWLWM**=<*n*> where *n*=0 means no security, *n*=1 means 64-bit key, and *n*=2 means 128-bit key
   - **AT+iWLKI**=<*n*> where *n* is the WEP key index (*n*=1..4)
   - **AT+iWLK**<*n*>=<*keyString*> where *n* is an index between 1 and 4, and *keyString* is the WEP key string in the n^{th} position.
8. If you want to enable WPA encryption, configure the following parameter: **AT+iWLPP**=<*passphrase*> where *passphrase* is the pass-phrase to be used in generating the WPA1-PSK encryption key. It is normal for the iChip to take a few moments before returning I/OK in this case.
9. Enter **AT+iDOWN** in order to reset the module and connect to the WiFi network.

At this stage a connection to the Access Point should be established. Verify that the module has received an IP address from the DHCP server by issuing the AT+iIPA? command. The module should reply with I/<IP address>.

To test the connection, use the iChipConfig utility to perform any activity that requires network connection such as retrieving a web page, sending an email, or opening a socket. You may also try to PING the iChip from another station on the network.

6. Testing the Nano WiReach SMT Ethernet Connection

The II-EVB-365 SMT contains a standard 10/100BaseT RJ45 connector that allows a direct connection to a wired LAN. To test the Ethernet LAN connection, you need to configure the Nano WiReach SMT for your LAN:

1. Connect the module to the LAN network.
2. Start the iChipConfig Utility on your PC.
3. In the main window of the utility, click the Dumb Terminal icon.
4. In the Dumb Terminal window, enter the **AT+i** command to verify that the iChip is communicating with your PC. You should receive an **I/OK** in response. If this has failed, click the "Setup Port" button and select the correct COM port. When using a USB connection, select the USB virtual COM being used.
5. Configure the module IP address in the +iDIP parameter. Set AT+iDIP=0.0.0.0 if you want the module to receive IP settings for the network's DHCP server.
6. Set +iDIP to an IP address to skip the DHCP process and use a fixed IP. In this case you should also define the +iSNET (subnet) parameter. For example, AT+iSNET=255.255.255.0

7. Change the LAN type parameter to 2 (LAN) using the following command: AT+iLTYP=2
8. Enter **AT+iDOWN** in order to reset the module and connect to the LAN network.

   To test the connection, use the iChipConfig utility to perform any activity that requires network connection such as retrieving a web page, sending an email, or opening a socket. You may also try to PING the iChip from another station on the network.

9. Restore the LTYP parameter to zero to return to the default Wireless-LAN operation.

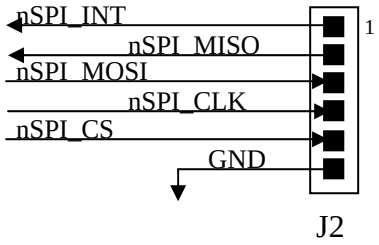
7. Additional Connections

The modules support two additional connections:

SPI Slave

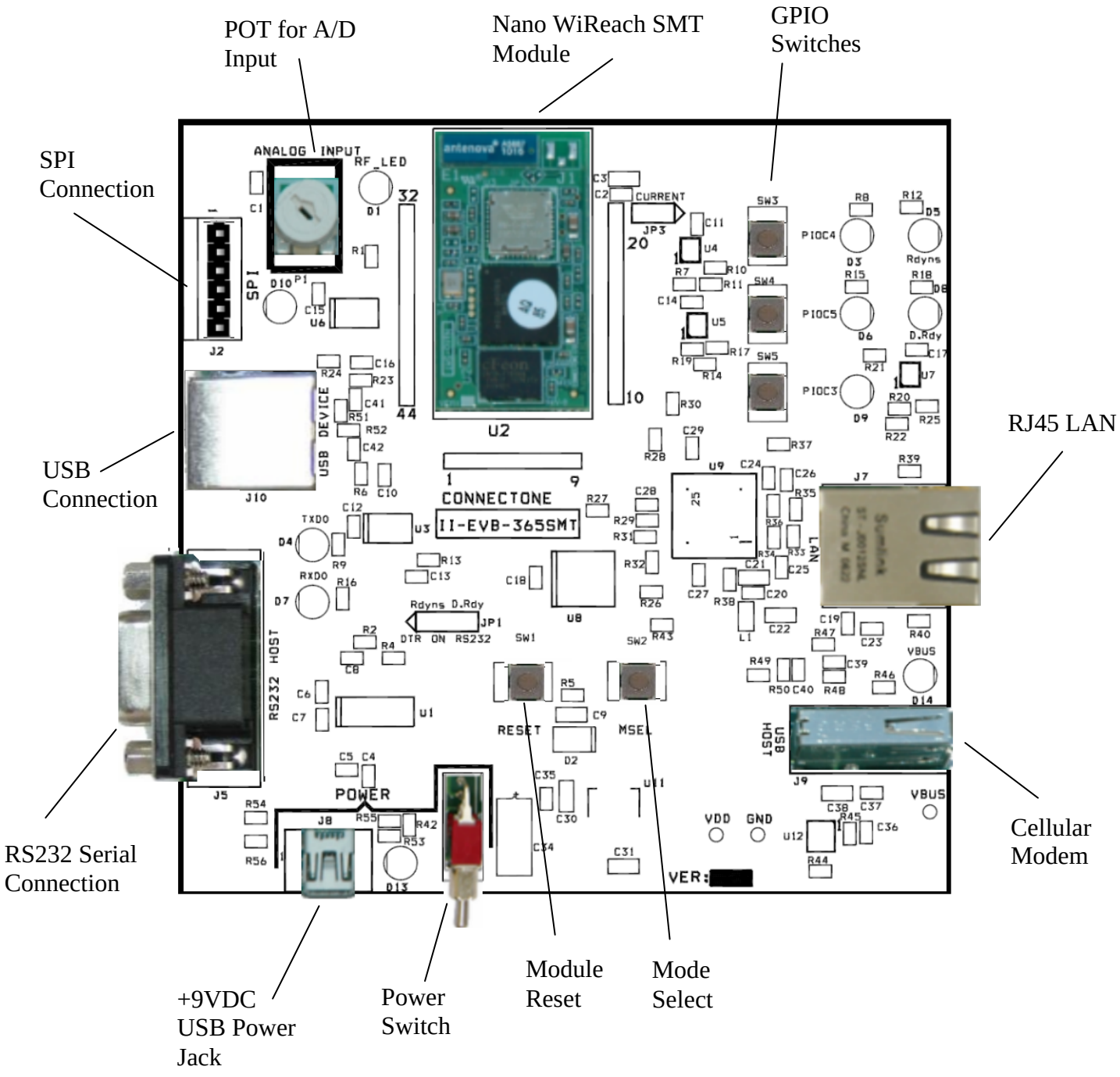
The modules support an alternative Host interface to the RS232 Serial port and the USB connection. A host equipped with an SPI Master connection may connect to the module's SPI Slave port and interact with the module with AT+i commands.

An SPI cable (not supplied) connects to the II-EVB-365 SMT J2 SIP connector:



A full description of interfacing the modules with SPI is included below in Appendix 4.

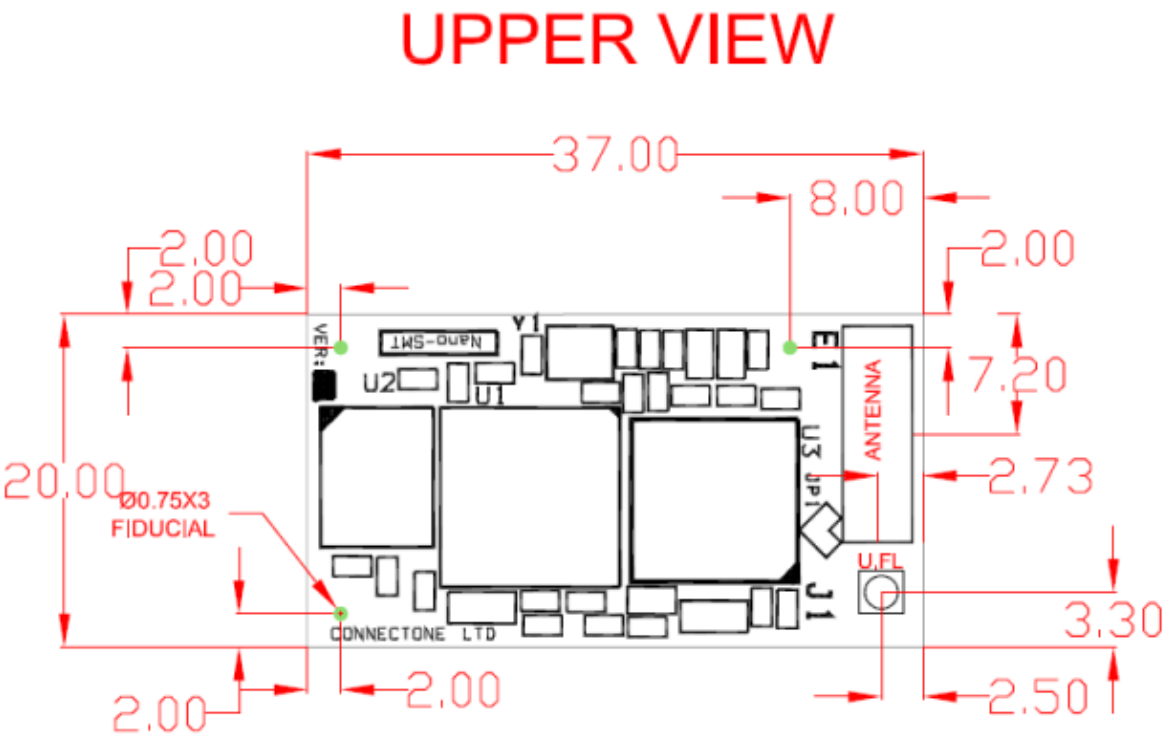
Connectors and Switch Positions

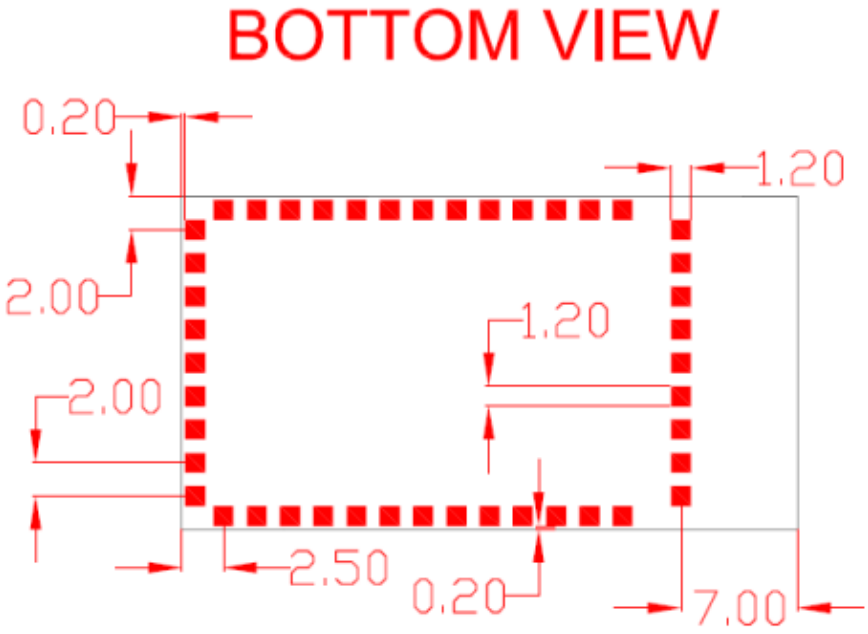


8. II-EVB-365 SMT Bill of Materials

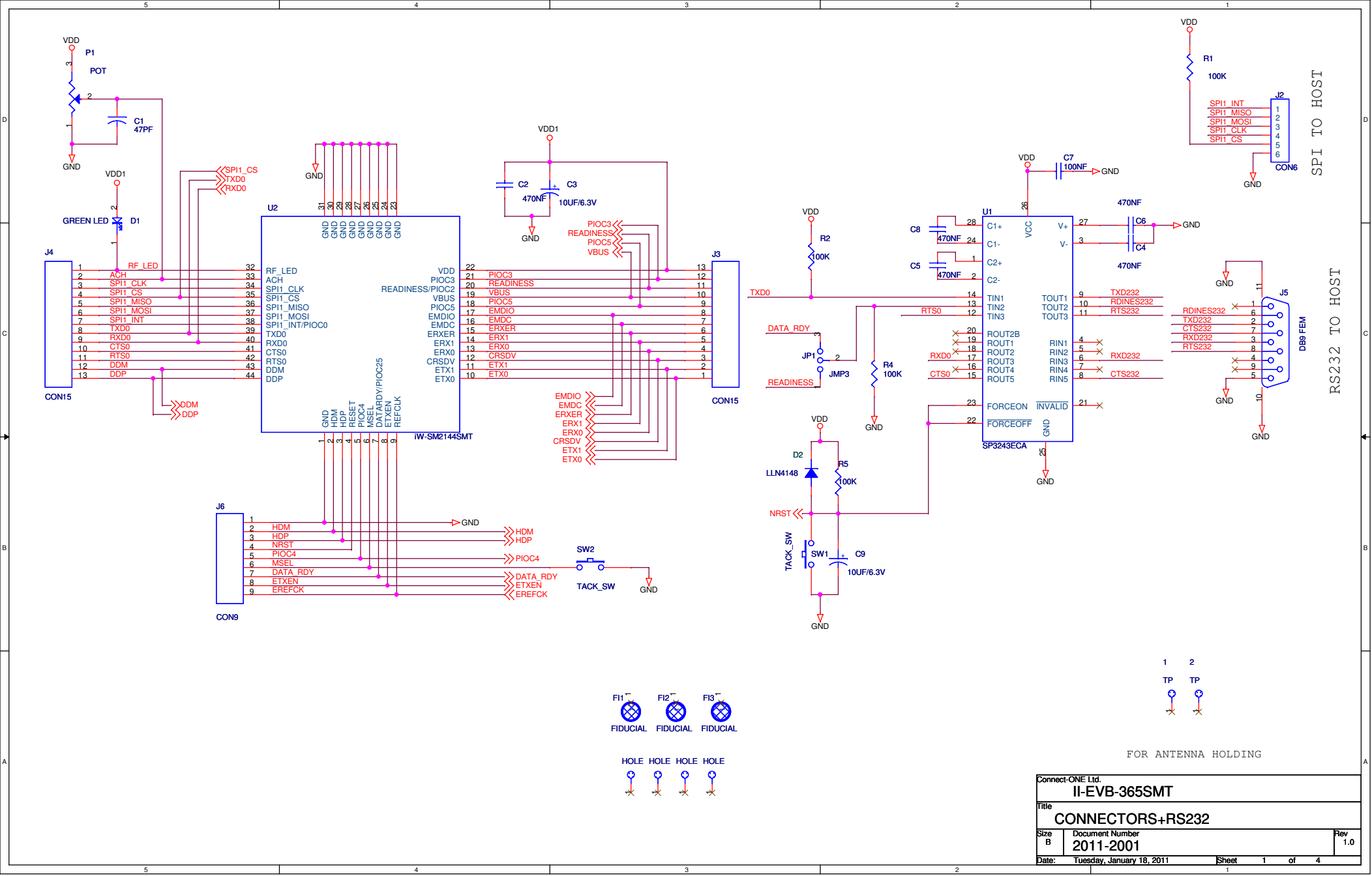
Item	Quant.	Reference	Part	Manufacturer
1	3	C1,C39,C40	47PF	Any
2	9	C2,C4,C5,C6,C8,C10,C13,C16,C36	470NF	Any
3	5	C3,C9,C30,C31,C38	10UF/6.3V	Any
4	18	C7,C11,C12,C14,C15,C17,C18,C19,C20,C23, C24,C25,C26,C27,C28,C29,C35,C37	100NF	Any
5	2	C21,C22	100UF/6.3V	Any
6	1	C34	220UF/10V	Any
7	2	C41,C42	15PF	Any
8	10	D1,D3,D4,D5,D6,D7,D8,D9,D10,D14	GREEN LED	Any
9	1	D2	LLN4148	Any
10	1	D13	RED LED	Any
11	1	JP3	JUMPER	Any
12	1	J2	CON6	Any
13	1	J5	DB9 FEM	Any
14	1	J7	203199	ERNI
15	1	J8	USB MINI B	Any
16	1	J9	USB-A	Any
17	1	J10	USB-B	Any
18	1	L1	BK2125HM601	Taiyo Yuden
19	1	P1	POT 10K	Any
20	13	R1,R2,R4,R5,R6,R7,R13,R14,R19,R20,R23, R25,R44	100k	Any
21	15	R8,R9,R11,R12,R15,R16,R17,R18,R21,R22, R24,R39,R40,R42,R46	470	Any
22	4	R10,R29,R30,R31	10K	Any
23	6	R26,R27,R33,R34,R35,R36	49.9 1%	Any
24	2	R28,R32	3K	Any
25	1	R37	0	Any
26	1	R38	6.8K1%	Any
27	1	R43	100k	Any
28	1	R45	1K	Any
29	4	R47,R49,R51,R52	27	Any
30	2	R48,R50	15K	Any
31	2	R53,R54	75K	Any
32	2	R55,R56	49.9K	Any
33	5	SW1,SW2,SW3,SW4,SW5	TACK_SW	Any
34	1	SW6	SWITCH	Any
35	1	U1	SP3243ECA	Sipex
36	1	U2	iW-SM2144SMT	Connectone
37	2	U3,U6	74VHC123AMTCX	Fairchild
38	3	U4,U5,U7	NC7WZ04P6X	Fairchild
39	1	U8	F4100-50MHZ	Fox Online
40	1	U9	DM9161A	davicom

Appendix 1: Nano WiReach SMT Mechanical Views





Appendix 2: II EVB 365SMT Schematics



Connect-ONE Ltd.	II-EVB-365SMT
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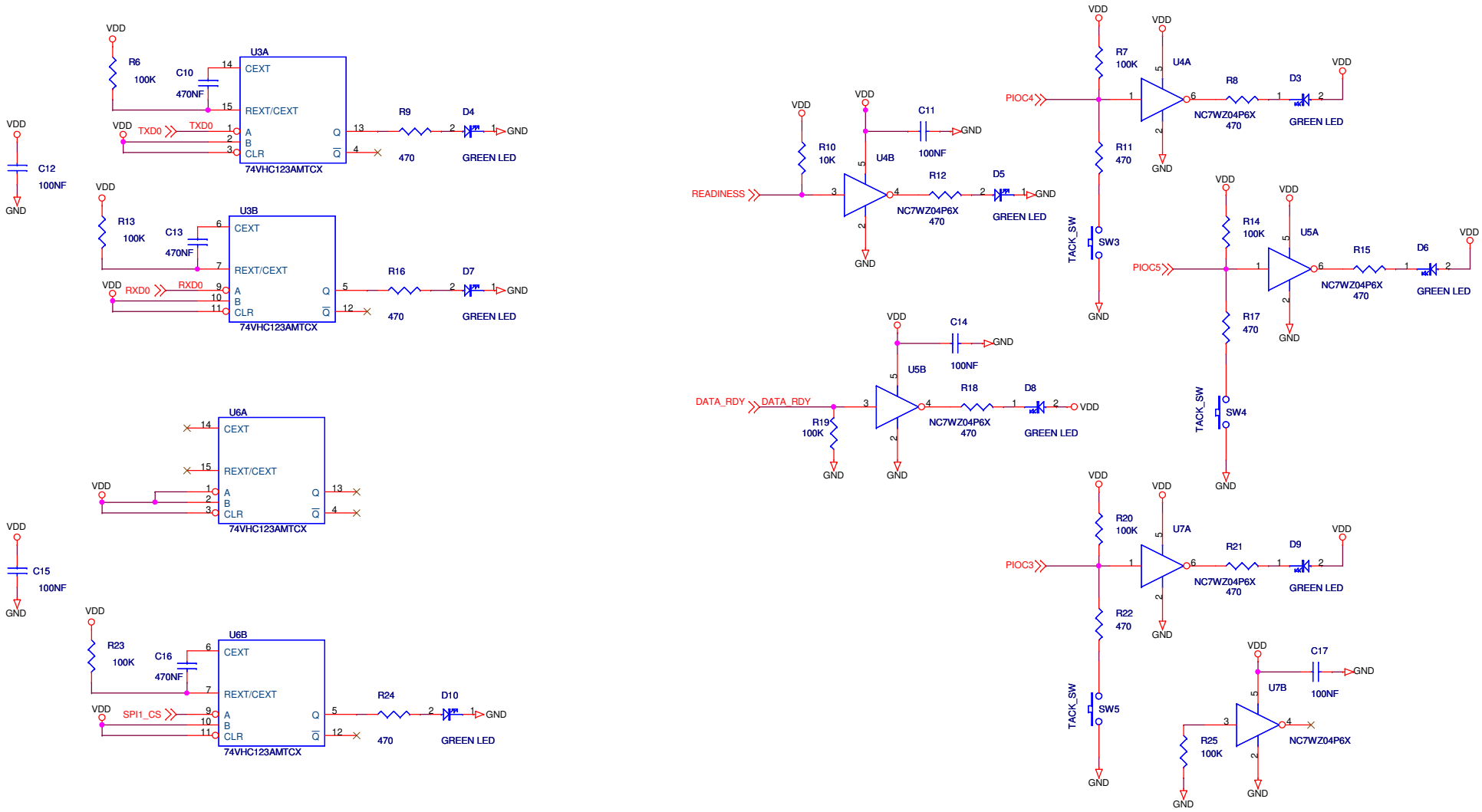
Size B	Document Number 2011-2001 Rev 1.0
Date: Tuesday, January 18, 2011	Sheet 1 of 4



Connect-ONE Ltd.		
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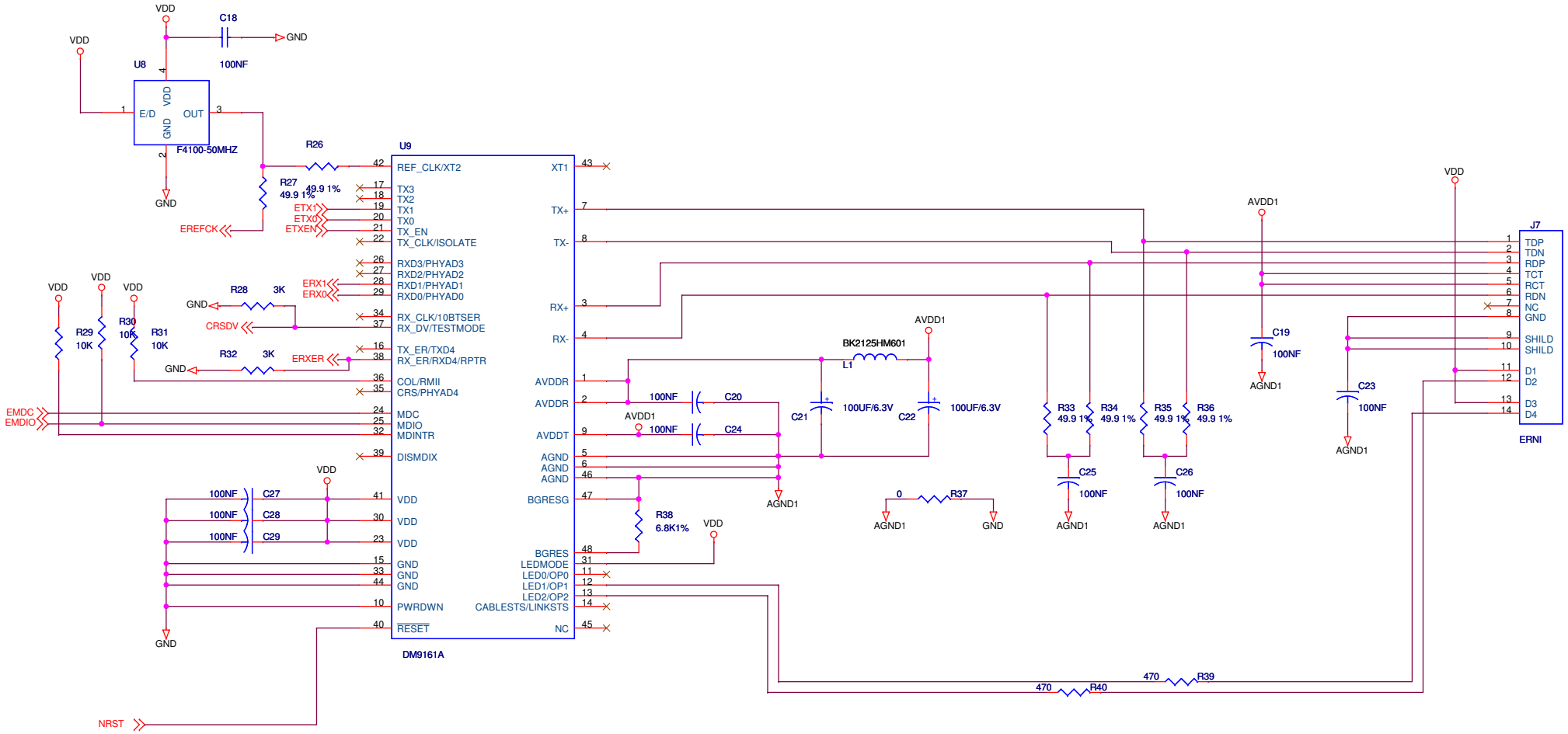
Title: I/O		
Size: B	Document Number: 2011-2001	Rev: 1.0
Date: Sunday, January 16, 2011	Sheet 2 of 4	



Connect-ONE Ltd.		
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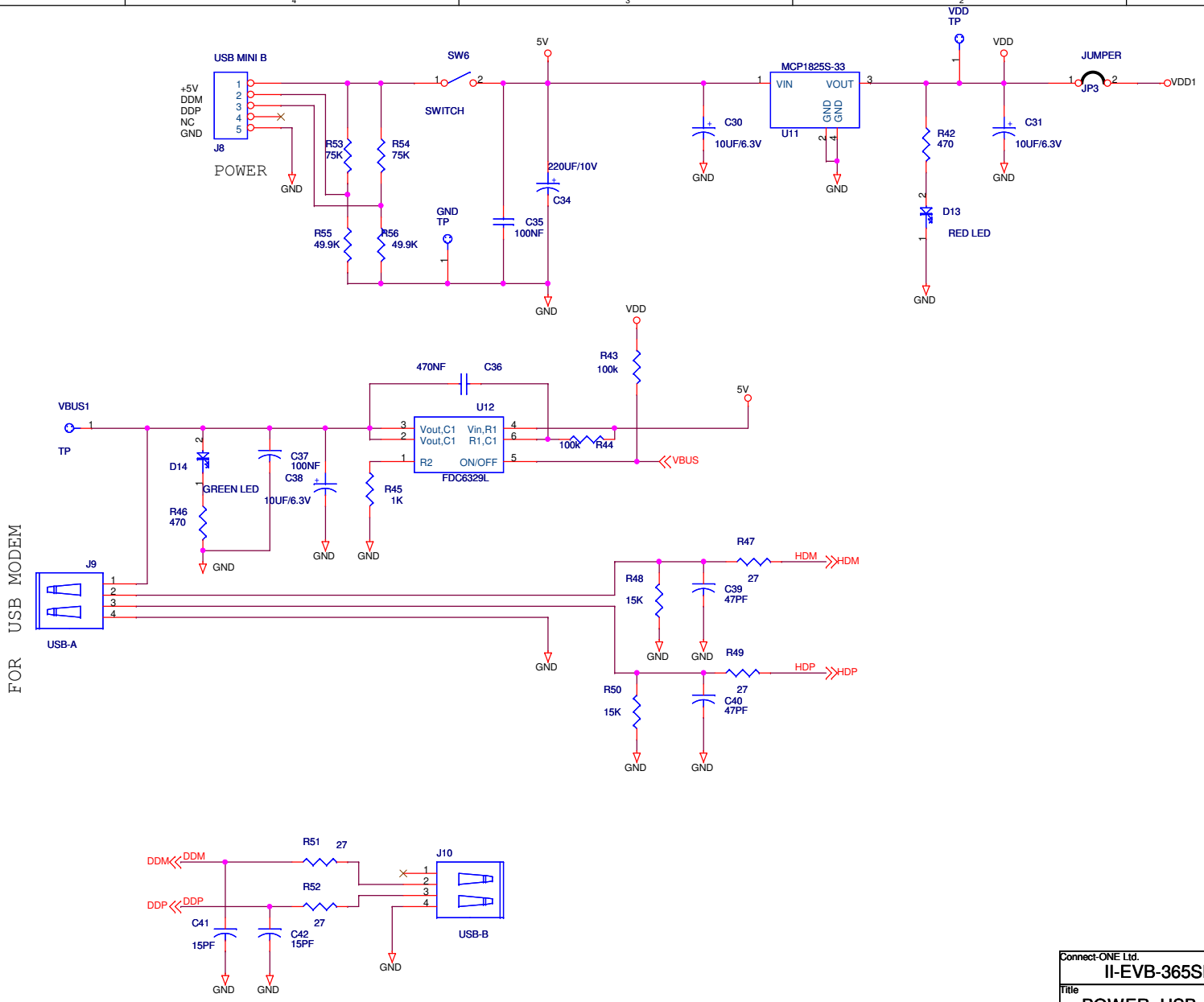
Size: B	Document Number: 2011-2001	Rev: 1.0
Date: Thursday, January 13, 2011	Sheet 3 of 4	



Connect-ONE Ltd.		
II-EVB-365SMT		
Title: POWER+USB		
Size: B	Document Number: 2011-2001	Rev: 1.0
Date: Monday, April 11, 2011	Sheet 4 of 4	

Appendix 3: Installing USB Drivers on a PC

Installing the USB driver:

The USB driver is supplied in three separate files: **sabalo.inf**, **iChip.inf** and **usbser.sys**. These files may be obtained on the Connect One Web site under:
Support >> Drivers & Utilities at: http://www.connectone.com/support.asp?did=30.

1. Copy “sabalo.inf” and “iChip.inf” to the directory C:\WINDOWS\inf. To view the \inf directory, you must allow viewing of hidden folders in Folder Options.

2. Copy usbser4.sys to C:\WINDOWS\system32\drivers.

3. Connect one end of a USB cable to your PC. Connect the other end to the USB “device” connector of the II-EVB-365 SMT board on which the module is mounted.

4. Turn on the power to the EVB board.

5. The “Found New Hardware Wizard” of Windows XP pops up and prompts you to install a new device driver. When prompted with the message “Can Windows connect to Windows Update to search for software?” Select **No, not this time**. See Figure 1.

Device Manager
File Action View Help
Batteries
Bluetooth
Computer
CSR BlueCore Devices
Disk drives
Display adapters
DVD/CD-ROM drives
IDE ATA/ATAPI controllers
Keyboards
Mice and other pointing devices
Modems
Monitors
Network adapters
PCMCIA adapters
Ports (COM & LPT)
Communications Port (COM1)
Toshiba BT Port (COM11)
Toshiba BT Port (COM20)
Toshiba BT Port (COM21)
USB Device
Processors
Smart card readers
Sound, video and game controllers
System devices
Universal Serial Bus controllers
Generic USB Hub
Generic USB Hub
Intel(R) 82801G (ICH7 Family) USB Universal Host Controller - 27C8
Found New Hardware Wizard
Welcome to the Found New Hardware Wizard
Windows will search for current and updated software by looking on your computer, on the hardware installation CD, or on the Windows Update Web site (with your permission).
Read our privacy policy
Can Windows connect to Windows Update to search for software?
Yes, this time only
Yes, now and every time I connect a device
No, not this time
Click Next to continue.
< Back
Next >
Cancel

Figure 1

6. When prompted with the message “What do you want the wizard to do?” Select **Install the software automatically (Recommended)**. See Figure 2.

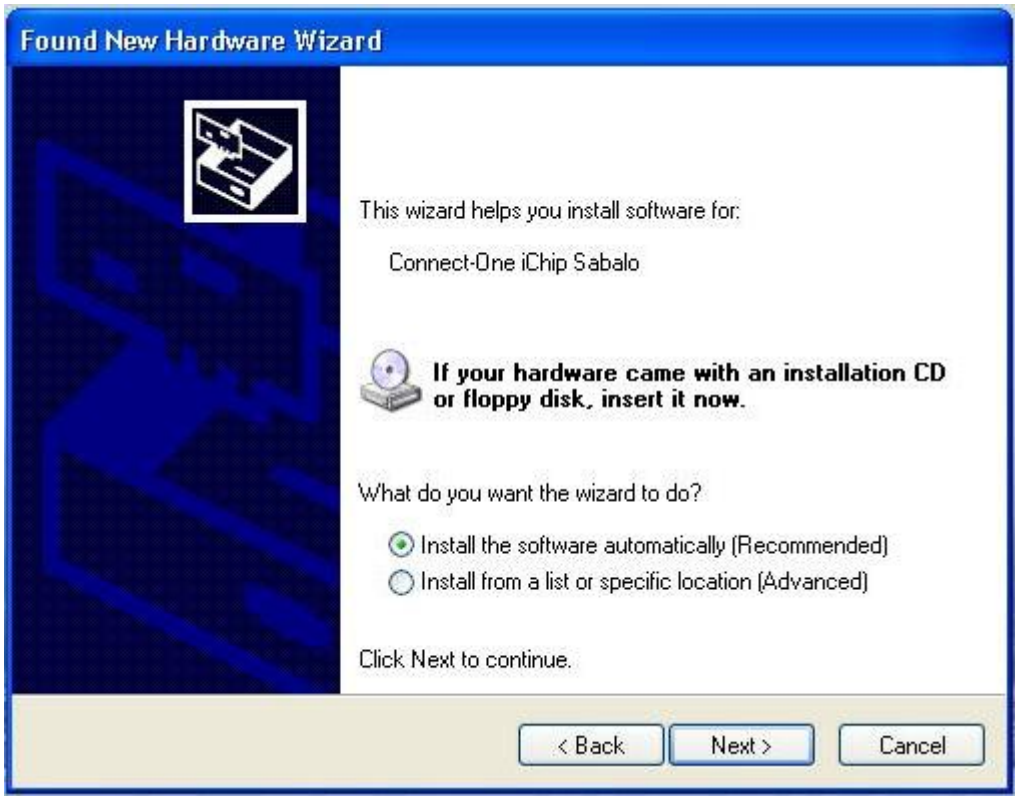

Found New Hardware Wizard
This wizard helps you install software for:
Connect-One iChip Sabalo
If your hardware came with an installation CD or floppy disk, insert it now.
What do you want the wizard to do?
Install the software automatically (Recommended)
Install from a list or specific location (Advanced)
Click Next to continue.
< Back
Next >
Cancel

Figure 2

7. Windows will install the driver. See Figure 3.

Found New Hardware Wizard
Please wait while the wizard installs the software...
Connect-One iChip Sabalo
Setting a system restore point and backing up old files in case your system needs to be restored in the future.
< Back
Next >
Cancel

Figure 3

Hardware Installation
The software you are installing for this hardware:
Connect-One iChip Sabalo
has not passed Windows Logo testing to verify its compatibility with Windows XP. (Tell me why this testing is important.)
Continuing your installation of this software may impair or destabilize the correct operation of your system either immediately or in the future. Microsoft strongly recommends that you stop this installation now and contact the hardware vendor for software that has passed Windows Logo testing.
Continue Anyway
STOP Installation

Figure 4

8. When a pop-up window reports that the software for the new hardware — Connect One Sabalo USB Device — has not passed Windows Logo testing, select **Continue Anyway**. See Figure 4.

9. The USB driver is now installed and ready for use. See Figure 5.

Figure 5

Viewing the properties of the new driver:

1. From the Windows task, click **Start > Settings > Control Panel**.

2. Double-click the **System** icon.

3. In the dialog box displayed, select the **Hardware** tab.

4. Click the **Device Manager** button.

5. If the Flash memory is empty: Open the **Modems** list to find the Connect One Sabalo USB Device. The virtual COM port number will be written in the properties information of this device.

6. If the Flash memory is already programmed: Open the **Ports** list to find the Connect One iChip Sabalo port number. See Figure 6.

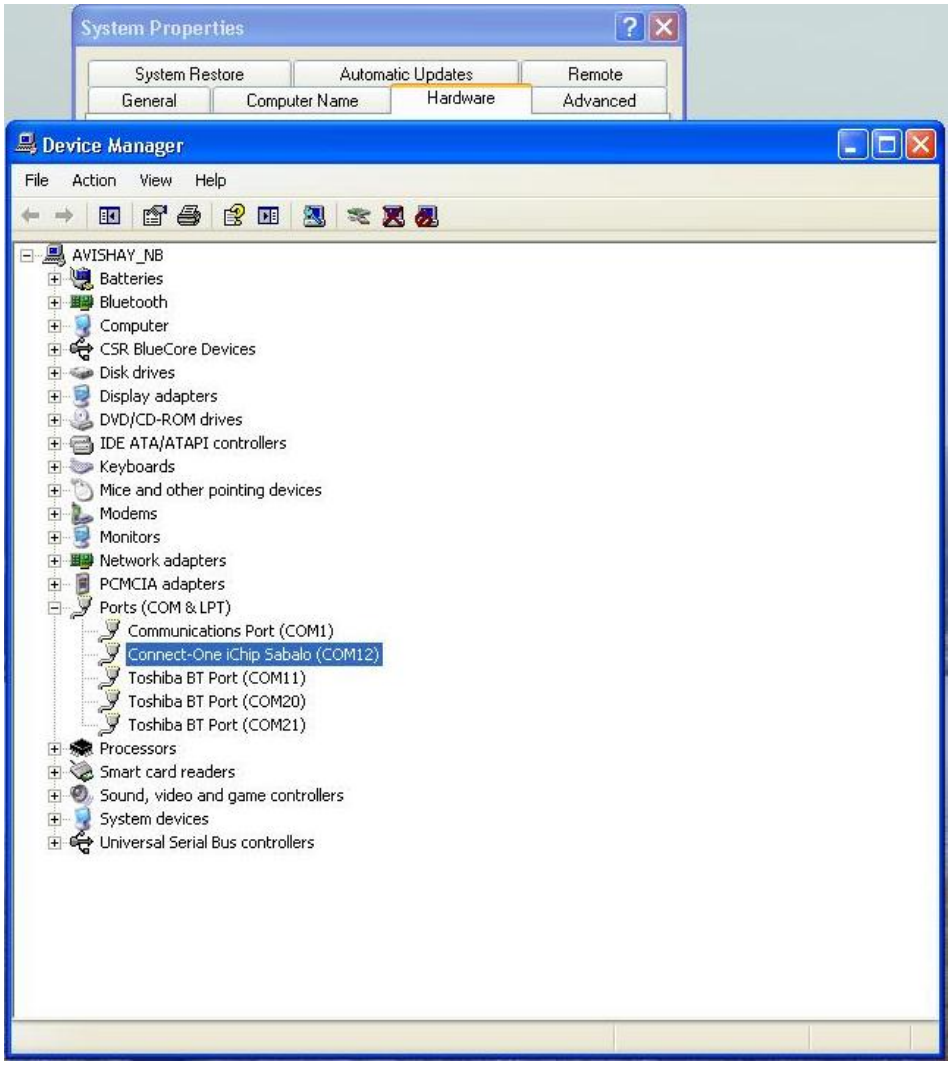

System Properties
System Restore
Automatic Updates
Remote
General
Computer Name
Hardware
Advanced
Device Manager
File
Action
View
Help
AVISHAY_NB
Batteries
Bluetooth
Computer
CSR BlueCore Devices
Disk drives
Display adapters
DVD/CD-ROM drives
IDE ATA/ATAPI controllers
Keyboards
Mice and other pointing devices
Modems
Monitors
Network adapters
PCMCIA adapters
Ports (COM & LPT)
Communications Port (COM1)
Connect-One iChip Sabalo (COM12)
Toshiba BT Port (COM11)
Toshiba BT Port (COM20)
Toshiba BT Port (COM21)
Processors
Smart card readers
Sound, video and game controllers
System devices
Universal Serial Bus controllers

Figure 6

FAQs

Q: What should I do if Windows does not automatically locate the driver for the new hardware?
A: Please use the "Back" button to browse to the previous step and manually browse to the directory of the iChip Configuration Utility, usually located in "C:\Program Files\iChipConfig".

Q: What should I do if Windows identifies new hardware but the wizard does not pop up automatically?
A: You can invoke the wizard manually from the Control Panel.

Q: What should I do if Windows notifies me that "USB Device Not Recognized"?
A: Please make sure that the cable is connected properly to the board side. Then disconnect the USB cable from the computer side and try to connect it to another USB port. Prefer a port which is located on the computer rather than use a USB hub.

Q: Should I repeat this installation procedure every time I connect the board over USB connection to the same computer?
A: No. The installation is required only on the first time the board is connected to each computer. Afterwards the board will be automatically recognized and ready to communicate over USB.

Appendix 4: WiFi Configuration Notes

Introduction

The AT+I programmer's manual includes full details for WiFi configuration. Please visit the support section on Connect One's website to obtain the last version. The following is a partial overview of WiFi related commands.
Wireless LAN stations operate in one of two modes: Infrastructure or Ad-Hoc.

In Infrastructure mode, wireless LAN stations connect to a wireless LAN Access Point (AP), which acts as a hub. Wireless LAN stations may connect to each other through the AP. If the AP is connected to LAN, it allows wireless LAN stations to connect to other stations on the LAN. When a gateway is in place, it enables wireless LAN stations to connect to systems across the gateway, as well.

In Ad-Hoc mode, two or more wireless LAN stations communicate directly with each other.

The Nano WiReach/Socket iWiFi supports the 802.11b/g wireless LAN communication platform. It uses the iChip™ CO2144 communication controller chip and Marvell 88W8686 WiFi chipset. It incorporates several dedicated AT+i configuration parameters to support the wireless LAN environment. See the table below for a detailed list of WiFi configuration parameters.

AT+i Parameter Name	Description
WLCH	Wireless LAN Communication Channel
WLSI	Wireless LAN System-Set ID
WLWM	Wireless LAN WEP Mode
WLKI	Wireless LAN Transmission WEP Key Index
WLKn	Wireless LAN WEP Key Array
WLPS	Wireless LAN Power Save
WLPP	Personal Shared Key Pass Phrase
WLRS	Wireless LAN Rescan Interval

Table 1: AT+i Wireless LAN Configuration Parameters

The Nano WiReach/Socket iWiFi may also be configured to exploit WEP security. iChip supports configuration of both 64-bit or 128-bit WEP keys.

In Infrastructure mode, Power Save mode is supported. When activated, Power Save shuts down the station for a limited period of time, during which the Access Point buffers incoming packets destined for the deactivated WiFi station. The station periodically wakes up to retrieve all the buffered packets stored in the Access Point. In this mode, total power consumption is lowered at the expense of higher response latency. The Nano WiReach/Socket iWiFi may be configured to put the WiFi chipset in Power Save mode in conjunction with iChip's inherent Power Save mode.

iChip Wireless LAN Environment Configuration Parameters

WLCH (Factory Default: 0)
In Infrastructure mode, the WLCH parameter **must** be set to 0. Other available values (1..13) designate the preferred communication channel while in Ad-Hoc mode.

WLSI (Factory Default: Empty)
This parameter **must** be assigned with the System-Set-ID string (SSID), which is identical to that configured in the Access Point(s) through which the WiFi station needs to connect. An exception to this is the "Any SSID" configuration, which is configured by simply leaving this parameter empty (or setting to NULL string with AT+iWLSI=""). In the "Any SSID" configuration, the WiFi station will connect to any available Access Point. If more than one Access Point is active, it will choose the one with the stronger radio signal.

WLWM (Factory Default: 0)
Configure this parameter to designate WEP security usage mode. If WEP is disabled, the WLKI and WLK*n* parameter settings are irrelevant. Note that WEP settings (with the exception of WLKI) **must** be identical to those configured in the Access Point device. Possible settings are:

WLWM Setting	WEP Security
0	Disabled
1	Enabled, using 64 bit keys
2	Enabled, using 128 bit keys

Table 2: WEP Security Mode Settings

WLKI (Factory Default: 1)
If WEP is enabled, this parameter defines the key index of the WEP key to be used when encoding outgoing WiFi packets. Since WEP includes configuration for an array of four possible keys, WLKI can receive a value in the range [1..4]. The value of this parameter **need not** be the same as that configured in the Access Point.

WLKn (Factory Default: All Empty)
These are four consecutive parameters (with *n* ranging from 1 to 4). The parameters define an array of 4 WEP security keys, which are used to encode outgoing WiFi packets (using the key defined by WLKI) and decode incoming packets according to the key issued by the Access Point device. Key size is 64- or 128-bits, according to the WLWM setting. The parameter values are used only if WEP security is enabled (WLWM > 0). The key values **must** be identical to those configured in the Access Point device.

WLPS (Factory Default: 0)
This parameter defines the chipset Power Save mode. When configured for Power Save mode, iChip links its own internal Power-Save mode with that of the Marvell chipset. When iChip's Power Save mode is activated (AT+iPSE=1), and when WLPS is greater than 0, iChip will force the chipset into Power Save mode. The value stored in WLPS defines the maximum length of time (in milliseconds) during which the Marvell chipset will snooze, before waking up to download any available packets that may have been buffered for it in the Access Point. WLPS may be set in the range:

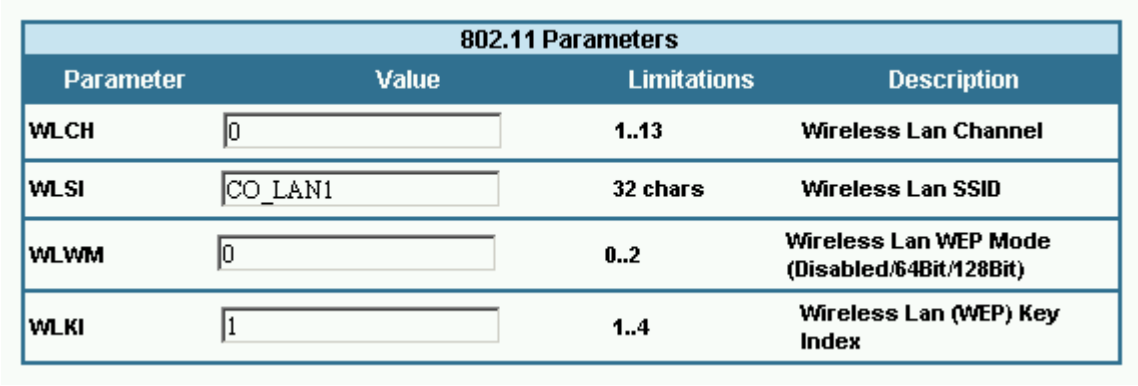
[0..3600]. When WLPS is set to 0, the Marvell chipset Power Save is disabled, even if iChip enters Power Save mode.

WLPP (Factory Default: Empty)
This parameter sets the wireless LAN WPA1-PSK pass-phrase to be used in generating the WPA1-PSK encryption key. When empty, WPA security is disabled. If WLSI (SSID) is not empty, WPA1-PSK security is enabled for WiFi connections and *WLPP* is used in generating the WPA1-PSK encryption key. The allowed value for *WLPP* is an ASCII string containing 8-63 characters.

WLRS (Factory Default: 0)
This parameter sets the interval between consecutive scans that iChip performs in search for nearby ad-hoc networks. Scan duration is two beacon periods (200 ms). WLRS may be set in the range: 0-65535 milliseconds.

Wireless LAN Configuration Web Site Page

iChip's configuration website includes two views that support configuration and status retrieval of related Wireless LAN parameters. The configuration view displays the configurable Wireless LAN AT+i parameters (WLCH, WLSI, WLWM, and WLKI). New values may be defined and submitted to iChip from the browser.



802.11 Parameters

Parameter	Value	Limitations	Description
WLCH	0	1..13	Wireless Lan Channel
WLSI	CO_LAN1	32 chars	Wireless Lan SSID
WLWM	0	0..2	Wireless Lan WEP Mode (Disabled/64Bit/128Bit)
WLKI	1	1..4	Wireless Lan (WEP) Key Index

Figure 7: Wireless LAN Web Configuration

Wireless LAN Status Report

The Wireless LAN AT+i Report (AT+iRP10) returns pertinent status information regarding the active 802.11b/g Wireless LAN link. In response to issuing the report command, iChip will reply with the following syntax:

I/(<port stat>, <xfer rate>, <sig level>, <lnk qual>)

Where,

port stat -- Port Status:
- 0: Wireless LAN adapter not present
- 1: Wireless LAN adapter Disabled
- 2: Searching for initial connection
- 4: Connected
- 5: Out of range

xfer rate -- Transfer Rate, in the range 1..4
(1 =>1 Mbps; 2 =>2 Mbps; 3 =>5.5 Mbps; 4 =>11 Mbps)

sig lvl	--	Signal Level [%], in the range 0..100
lnk qual	--	Link Quality [%], in the range 0..100

The Configuration website contains a live status page with this and some additional status information:

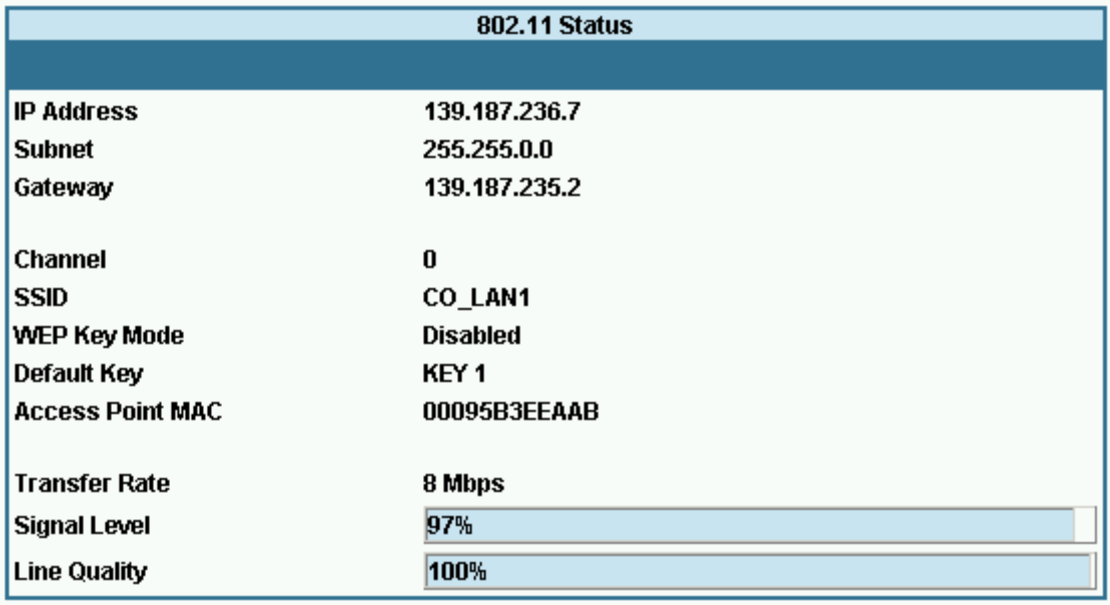


Figure 8: Wireless LAN Web Status Display

iChip Wireless LAN Test Mode

WLTR

This command limits the wireless LAN transmission rate according to the specified command parameter. The table below details the possible parameter values:

Maximum Transmission Rate	Detail
0	Maximum possible transmission rate for the current chipset.
1	1 Mbps
2	2 Mbps
3	5.5 Mbps
4	11 Mbps
5	Reserved
6	6 Mbps
7	9 Mbps
8	12 Mbps
9	18 Mbps
10	24 Mbps
11	36 Mbps
12	48 Mbps
13	54 Mbps

Table 3: Maximum Transmission Rate Command Parameter

When AT+i WLTR is issued, transmission rate is limited for the duration of the session until another AT+iWLTR command is issued, or iChip is power-cycled.

Placement and Range Guidelines

802.11b/g wireless LAN devices connect to wireless LAN Access Points over a maximum range of 300 feet. Actual transmission rate and service quality may vary significantly as a result of environmental obstacles and physical placement of the Access Point and station devices.

For best results, refer to the following guidelines:

1. Locate the wireless LAN equipment away from sources of interference, such as PCs, large metal surfaces, microwaves, and cordless phones.
2. Position the wireless LAN access point at an elevated position and as close as possible to the center of the area in which the wireless LAN devices will operate.

Wireless LAN Data Privacy/Security Considerations

The fact that wireless LAN devices transmit data over a radio link makes them vulnerable to electronic eavesdropping, tampering, and information theft. There are several means by which you may strengthen your wireless LAN access security:

- Change the factory default SSID setting of the wireless LAN Access Point and station devices. Enable WEP or WPA encryption of the wireless LAN data communications. If you use WEP, it is recommended that you use 128-bit WEP keys.
- Restrict 802.11b/g wireless LAN access based on MAC address. This is configurable in most Access Point devices.
- Place the 802.11b/g Wireless Access Point in a location where it cannot be physically tampered with.
- Store printed SSID and WEP or WPA key settings in a safe place.

For a complete Wireless LAN Configuration Guide for iChip products download the “WiFi Configuration Guide” form the Connect One Web site at: http://www.connectone.com/support.asp?did=42.

Appendix 5: SPI Host Interface

Introduction

The Nano WiReach/Socket iWiFi contains an SPI slave port, which allows a Host processor to interface the iChip using an SPI Master port.
The SPI data transfer shall be based on the 'Command-Response' principle. (Half Duplex). Meaning, until the HOST gets an answer to a command, it won't send a new one.
Several assumptions have been made:

- Number of bits per transfer is: 8.
- No echo from the module to HOST (i.e. when module's host interface is set to SPI, the command AT+iEn is meaningless.
- When module's host interface is set to SPI, the module won't support SerialNet mode since it is not Half Duplex compatible.
- When module's host interface is set to SPI, the module won't support the "+++" Escape sequence.

The SPI interface will have the following behavior:

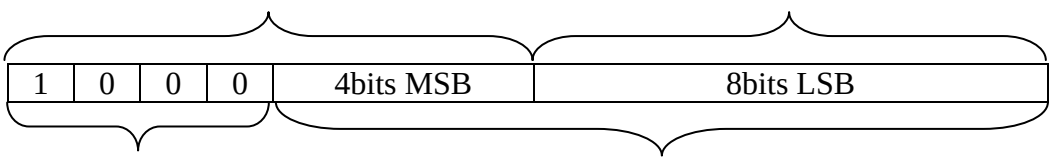
- Fixed peripheral select
- The CS is directly connected to the SPI Master device
- Mode fault detection is enabled
- The inactive state value of the serial clock is logic level zero
- Data is changed on the leading edge of the serial clock and captured on the following edge of the serial clock
- The peripheral chip select line rises as soon as the last transfer is achieved

SPI Protocol

A module GPIO Output signal is dedicated as the SPI Control signal (nSPI_INT). After receiving a command from the Host, the module will assert this signal for the duration of its response. The Host should not attempt to send the next command until this signal is de-asserted. The SPI control signal pin is defined with the new +iSPIP parameter described below.
The SPI control signal is also utilized as a flow-control signal when the Host transmits data to the module.

Data from module to Host (Slave to Master)

When the module replies to the Host commands it sends data packets preceded by a 2-byte header using the following structure:



Bit 15 is the Data-Ready bit **12bits Data Length**

The module's SPI driver asserts the SPI Control GPIO to indicate to the host to start reading the entire packet, starting with the header word and followed by the packet payload, whose length matches the 12 LSBits of the Header word.
All the received bytes from the host are ignored.

Flow Control - Data from Host to iChip Flow Control

Flow control from the module to the host is managed using the SPI control signal. The module will assert the SPI Control signal to signal flow stop.
As soon as the host identifies that the SPI control signal was asserted it should stop transmitting. When the module can resume reception, it will de-assert the SPI Control signal.

iSPIP — SPI GPIO Pin

Syntax:	AT+iSPIP=<*n*>
	Define a GPIO as the SPI Control signal
Parameters:	
n=0	SPI Control Signal is disabled
n=1..6	Use PIOC [<n>-1] as the SPI Control signal
Default:	0 – SPI Control signal disabled
Result code:	
I/OK	If *n* is a legal value.
I/ERROR	Otherwise
AT+iSPIP?	Returns the current SPIP value followed by **I/OK**.
AT+iSPIP=?	Returns the message **"0-6"** followed by **I/OK**.

Note: The setting will take effect only after SW or HW reset.

iHIF — Host Interface

The +iHIF (Host Interface) parameter is used to define if the SPI Host interface is to be used. A new value of **6** defines usage of SPI.

For example, AT+iHIF=6 -- Selects SPI as the Host ⇔ module interface.